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SOME NOTES ON EGYPTIAN AGRICULTURE

By Anna Botsford Comstock

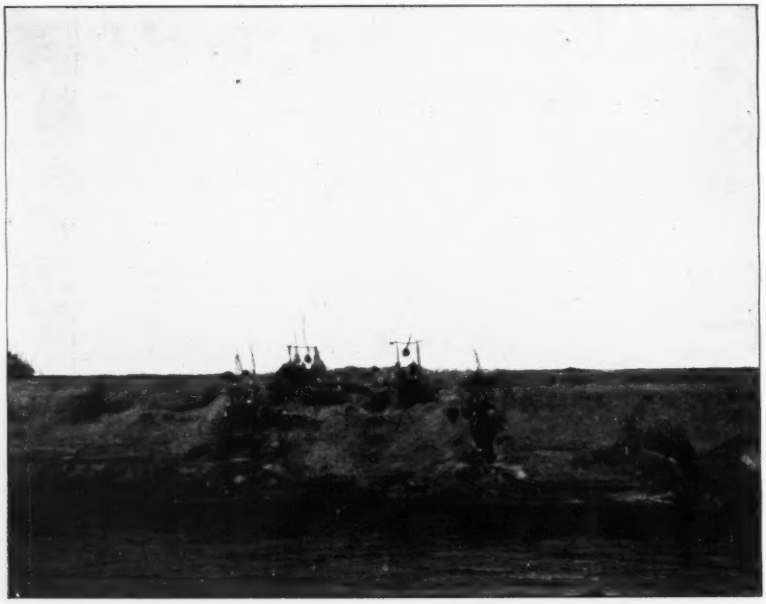
With Snapshots by J. H. Comstock

THE most potent factor in the spell of enchantment which Egypt exerts over the traveler from the Occident is its preservation of ancient customs; and the ancient methods of its agriculture first make the American farmer smile, then study and then admire the wonderful results secured by such primitive methods. Cheap labor and backache power seem to wrest from the soil crops which our high-priced labor and modern machinery can scarcely attain. Our stay in Egypt was during the months of January and February, and although we were greatly interested in Egyptian agriculture, we unfortunately lacked the time and the knowledge of the native language necessary for a thorough understanding of all that we saw; therefore, our notes are necessarily brief and superficial.

When we crossed the Nile Delta in January the new grain was just turning green the dark soil, and here and there fields of clover gave a touch of vivid green to the otherwise colorless landscape. There were acres and acres of cotton already picked and the old stalks were being carefully gathered and made into bundles for fuel. There was also a fairly large acreage of maize, but much had been harvested, and the milk-white ears were drying in the sun, guarded by protecting hedges of the stalks made into sheaves, and the land on which it grew was being plowed for another crop. The plows used were certainly but a slight improvement on the one that Abel found himself obliged to invent as the first tiller of the soil; the team was sometimes an ox or a cow or a camel and a small horse hitched together--teams so queerly matched that the gait of one-half must have kept the other half "guessing;" and clearly proved that the white turbaned, long gowned man holding the plow had no nerves to speak of else he must have gone mad long ago.

Although the Delta is the richest land of Egypt, except perhaps Fayoum which we did not see, yet the banks of the Nile for several hundred miles above the Delta were very fertile, since they too are submerged during the inundation. The crops we saw growing there were clover, wheat, millet and much sugar cane, while the date palms clustered about the villages and gave large yields. The strip of vivid green on each bank of the river made by the growing crops is sometimes a mile or more and sometimes only a few rods in width; and always on its farther edge lies the desert. The change from beautiful fertility to the yellow sands is so abrupt it seems as if one might reach from one to the other by a single step; and the deserts on either side the Nile have in them no signs of vegetation whatever; they make our American deserts seem like veritable gardens.

Of course, we looked at the Fellahin or farmers themselves with great interest; they seemed to us a sombre race; whether this sombreness is the result of despair or stoicism we could



RAISING WATER FROM THE NILE FOR IRRIGATION BY MEANS OF SHADOUFS SIMILAR TO OUR OLD-FASHIONED WELL SWEEPS

not determine. The men are stalwart, dark, with strong features and look toil worn. They dress in long, loose-sleeved gowns of dark brown or blue, and, for the most part, wear light colored turbans. When walking they usually carry a staff. The women are enveloped, head and all, in dark brown, cloak-like garments and usually go unveiled (that which no respectable city woman would do); often they have their chins and forehead tattooed in greenish-blue ink. The children wear loose, shirt-like garments of ordinary calico with little knit skull caps or the fez as head covering. The people of all ages and sexes work hard, and one sees very little sign of recreation among them.

The Fellahin live in villages the houses of which are usually made of bricks of the almost black Nile mud. The streets are narrow and very dirty. All of the water used in the villages is carried from the river in jars on the heads of the women, or in goat skins on the backs of the old men. On the top of the houses may be seen large, earthen jars and neatly piled cakes of cow and camel dung drying for fuel. We asked what the jars were used for and were told as follows by various people: "They are bread jars;" "the bees live in them;" "they are water jars;" "the little children are put in them to keep them safe during their parents' absence." However, we dare not put much faith in any of this interesting information; the Arab dragoman cannot understand the inquiring American mind and his answers are given with the intent to soothe rather than to inform.

The villages in the inundated districts are usually reached and connected by roads made on the top of high embankments so as to be above the floods. We saw from our boat processions going out from these villages every morning toward the fields. Men, women and children, with camels, donkeys, buffalo and herds of sheep and goats, all marching fieldward outlined against the sun-rise

sky on this truly high road, and we saw again these processions silhouetted against the horizon at sunset returning from long days of labor. They told us that the Fellahin eat only a light lunch in the middle of the day, which they carry with them, but in the evening they have a hot meal, the main part of which is a savory stew or gravy in which they dip their hard bread; the chief ingredient of this gravy is onions, as any one can attest who has been in the vicinity of one of the villages during the evening.

We were much interested in the methods of raising water from the river to the land for irrigating purposes. After the period of inundation all of this land needs irrigating in order to produce the maximum number of crops. Where the river is almost on a level with the land, as in the Delta, the ancient screw of Archimedes is still in use; it is a funny sight to behold this long pump log with one end in the water and one upon the land and two turbaned men squatting on the ground working the screw which lifts a full and steady stream of water into the ditches.

Where the banks of the Nile are high above the stream there are two chief methods of lifting the water. One the sakieh consists of a sweep worked by cattle which turns a horizontal wheel which is geared to a vertical wheel attached to a drum which carries an endless belt bearing the earthen water jars, or if it is not too great a distance the jars themselves are fastened to the rim of the vertical wheel. Each jar as it goes under the water automatically fills itself and as automatically empties itself into a reservoir as the wheel lifts and turns it over. A bullock, buffalo, cow or camel is used as power in the sakieh. When only one animal is used it is blindfolded, but when two are yoked together they seem to hold each other up in the dizzy round. There is always one or more boys or men on hand to keep the animals moving; but occasionally we saw an instance where both men and animals were fast asleep and we rejoiced in the sight. I am sure if Dante had visited

IFTING WATER FOR IRRIGATION BY MEANS OF THE SAKIEH. NOTE THE WATER JARS ON THE WHEEL AND THE BLINDED BULLOCK

CAMEL LOADED WITH CABBAGE FOR THE CAIRO MARKET

Egypt he would have put this particular kind of work in his "Inferno," for I think that it is the nearest to infernal monotony of anything I have ever witnessed. However, there is a screen of cane or tamarisk trees to keep off the hottest sunshine and often a thatched roof above the animals: but even so it must be a dreary and wearisome performance.

The other method of lifting water up the higher banks is by means of the shadouf which works on the principle of the old fashioned well sweep. Two standards, usually made of cane, plastered into cement pillars with the Nile mud, support a cross piece on which works the long sweep, which is weighted at one end with a great ball of Nile mud and bears at the other a large rather shallow bucket of goat skin or of tin. A man pulls down the bucket to the water and the weight lifts it, and the man tips the bucket emptying it into a reservoir. Where the banks are quite high there is a succession of these sweeps one behind the other lifting the water from river to reservoir, then from reservoir to reservoir until the level of the land is reached. Early in the morning the men who work these shadoufs wear the ordinary clothing, but with the heat of the advancing day they shed this, retaining only the turban which seems to protect them from sunstroke. Of course, the American wonders why machinery for lifting water is not introduced on the Nile; but there are plenty of reasons why modern methods do not apply in Egypt. Some syndicate owning sugar plantations put in machinery for irrigating and took such quantities of water that there seemed a danger that the farmers below would be robbed. Therefore, a high water-tax is put upon all machine lifted water, but if it is lifted by men or animals it is free.

The stock of the Egyptian farmer consists of goats, usually black or brown, and sheep of different breeds, one kind being reddish-brown or black with wide, fat tails which taper to a curl at the end. The sheep and goats are herded by children or men. The donkey is the chief beast of burden and certainly its life is a burden; and we

cease to wonder at the agonizing bray which characterizes this animal after we have seen what it has had to endure in Egypt for the past thousands of years. Next to the donkey the camel is the chief carrier of produce. Sometimes its load is cabbage, sometimes a stack of clover or rope panniers filled with smaller vegetables and often we saw him looking like a caddis worm in a lengthwise load of sugar cane that covered him like a tube. The cattle are large, yellowish in color, and look like the Jerseys except that they are larger. The cows are as likely to be draught beasts as are the bullocks. The buffalo are also used commonly oth for draught beasts and for milk; these animals like the water and we often saw them wading up to their backs in the river. But whether the beast of burden be the donkey, camel or cattle they are almost always poor, thin, overworked and underfed creatures.

We saw very little agricultural machinery of any kind; everything is done by hand. However, we were much interested one day in Assiut to see a man with oxen threshing millet or durah; his threshing machine was made like a disc harrow and was hauled around and around upon the grain by the oxen.

And yet, with all of the drawbacks of an arid country, a retarded civilization and lack of tools, the Egyptian farmers raise the most luxurious crops, and as we see their beautiful fertile fields, we do not wonder that in the ages past they worshipped the river Nile as a God from whence they drew fertility and life-giving beneficent waters.

THE GRADUATE SCHOOL OF AGRICULTURE

By Dean L. H. Bailey

THE third session of the Graduate School of Agriculture exceeded its predecessors in the attendance and in the enthusiasm aroused, and probably also in the efficiency of the work. This School is conducted by the Association of American Agricultural Colleges and Experiment Stations through its Committee on Graduate Study. The Faculty is chosen from different institutions. It is to be expected that as this work develops from year to year greater effectiveness will be possible; it is, therefore, in the nature of the case that the school this year excelled those of preceding years.

The registration this year was practically double the registration of the school held by the Association two years ago at the University of Illinois. The number of registered students who paid their full fees this year was 122. In addition to this were 15 students registered in the Graduate School of Home Economics who were allowed to register in the Graduate School of Agriculture on the payment of half the fee. Inasmuch as the staff connected with the holding institution receives no pay for its services, the Committee on Graduate Study allows members of such staff to register without payment of fee. The holding institutions this year were the New York State College of Agriculture and the State Agricultural Experiment Station. Adding to the above numbers the persons who registered from the staff of these institutions, the total registration of students is 164. If to these are added the members of the Faculty of the Graduate School, coming from many parts of the country, the number becomes 242. Still in addition to this might well be counted the persons who attended the various group societies that were held during the month of the Graduate School, as the Society for Teachers in Dairy Industry, Society for Teachers of Agronomy, Poultry Society, and the like. Adding these, the total number of different persons who were associated in various capacities with

the Graduate School were about 350. This includes a very large number of those who are engaged in advanced agricultural teaching and experimenting in North America.

A departure in the staff of the Graduate School was made this year in securing some teachers outside the regular Land Grant Colleges; for example, Dr. L. B. Mendel of Yale gave a course of lectures on physiological chemistry; Dr. N. Zuntz of Berlin, also gave a course of lectures on biochemistry; Professor A. D. Hall of the Rothamsted Station, England, gave a course on soil investigations. The work of these persons attracted great attention and proved to be of great value in furthering the interest in the School.

From first to last the School had great momentum, showing that the subjects were vital and that the persons who are pursuing them in our agricultural institutions are energetic and alive. The month of July was crowded with events,—educational, social, and otherwise, and proved to be an exceedingly stimulating period. Every Wednesday evening and Friday evening were devoted to open meetings and discussions, with the subjects presented by some well known authority as a leader. The affiliated meetings were well attended and were characterized by great vitality.

The School left its impression on the New York State College of Agriculture, since the College was the meeting place of many of the very latest and most advanced ideas in regard to the scientific, economic, and social questions related to agriculture.

The New York Agricultural Experiment Station at Geneva was, with Cornell University, one of the holding institutions, it having joined in the invitation to the American Association of Agricultural Colleges and Experiment Stations to hold its Graduate School in New York in 1908. Some classes and excursions were taken to Geneva, and the staff of the State Experiment Station co-operated fully to make the Graduate School a marked success. Commissioner Pearson, representing the State Department of Agriculture, also co-operated and himself aided in giving some of the instruction.

The Graduate School of Agriculture is held every two years. It lies with the Committee on Graduate Study of the Association to determine where the School shall be held. The present Committee on Graduate Study will not determine the location of the next School inasmuch as the terms of two or three members of the Committee will expire at the meeting of the Association in Washington in November[1]. It is understood that two or three institutions at least will extend invitations to the Association for the School of 1910.

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[1]NOTE: The term of Dean Bailey, now chairman of the Committee, will expire at that time.

THE THIRD ANNUAL SCHOOL PICNIC

THE FACULTY TEAMS

FIRST to be recalled about Friday, May 29, 1908, is that the day dawned bright and gloriously clear, as beautiful as could have been wished. All work in the College was suspended for the day—in fact that was the only possible arrangement, for the faculty to a man, had promised to "get into" the games and the Field Day that was to precede the picnic. And furthermore, they did. Eight o'clocks were, however, in order (on the playground) for there were many preparations to be made before the beginning of the events. It is a question which had been anticipated the most, the Field Day for the College, or the picnic for the school children. At any rate both had been the subject of much discussion, and the cause of many a committee meeting for weeks.

The morning was allotted to the College but the welcome visitors began to arrive early, and while here one party was registering, there another receiving coat checks, and others making tours of inspection, already rival ball teams began to warm up on the play ground; teams ranging from the diminutive warriors in grey and red, to the older fellows, nearing graduation days, who played clean, snappy baseball.

At nine o'clock teams from the faculty, captained by A. D. Taylor, and from the undergraduates, led by G. H. Miller, began the day with an exciting contest that lasted for an hour, and ended with the undergraduates in the lead. By this time the greater part of the college body had arrived and the athletic events were quickly run off according to schedule. Competition was keen, but the interest and enjoyment was even keener, so that already success began to settle down upon the day's festivities. The most spectacular events were the relay race, twice around the play ground track, which was won by the class of 1909, and the various tugs-of-war. These were begun by an interclub struggle, in which the Round-up Club, and the Poultry Association having each won a heat, met in a strongly fought final, in which the Poultry Husbandmen, led by L. F. Boyle, were victorious. The interclass tug-of-war brought out some more good exhibitions, and the freshmen proved their huskiness by defeating '09 after '07 and '08 had been conquered in the preliminaries. The winners, however, had to meet the faculty team, and that weighty combination, captained by Professor Rice

GENERAL VIEW OF THE PLAYGROUND FROM THE STEPS OF THE AGRICULTURAL BUILDINGS.

and Dean Bailey, won the final prize out of the hands of the freshmen.

By the time the supremacies had been decided it was one o'clock and students, faculty and visitors, who had arrived to the number of a thousand or so, repaired to the orchard for lunch. Here typical picnic groups assembled and gallons of lemonade prepared by the College stimulated the consumption of many sandwiches and other refreshments. The Cadet band had been secured for this time, and amusements in the form of exhibition wrestling bouts kept away any thoughts of flagging interest. Before the resumption of athletics, after lunch, prize ribbons were awarded to the winners in the morning's games, by Mrs. Bailey.

It must not be imagined that during the morning the visiting scholars of the County merely watched, for they were enjoying activities all their own. After inspecting the campus and buildings, they assembled in the auditorium to listen to "alfalfa talks" by Commissioner Updike and Professor Warren. Samples of seed and innoculated soil had been prepared, together with instructions as to their use in home experiments, and these were distributed to the children.

In the afternoon, however, the play ground as well as the buildings as a whole, was theirs. They had baseball and medicine ball games, relay races, dashes, jumps, neck and wheel-barrow races, and every other form of athletic sport that could be thought of, and that will form we hope, a part of the rural school life of the future. The baseball attracted crowds at one end of the field while the field events gathered many spectators at the other. One special event that must not be forgotten, that had been delayed from its scheduled time in the morning, and that was perhaps, the most remarkable and spectacular of the day, was the Interfaculty ball game. Teams had been chosen for the east and west portions of the buildings and the rivalry was intense. It is doubtful whether anyone remembers the score, after the

excitement dependent upon Dean Bailey's home run, (*on a passed ball*) and the vigorous batting, with the best intentions, of Professor Wing. But the game and its remembrance will live in college history and, let it be hoped, not as the only, but the *first* of its kind.

By half past three, clouds had begun to appear in the north and in the expectation of a storm, the children were marshalled by W. E. Harries, '08 and the parade around the field commenced. It brought a new and striking sensation to the writer, and he doubts if he were the only one, to see the long line of fully twelve hundred children, mothers and fathers, headed by the Cadet band, march down the field towards the imposing building at the end. The line of march was past the steps of the buildings where the ranks were halted and brief addresses were made by Dean Bailey, the two Commissioners and "Uncle John." Then the band led the way around to the model schoolhouse, where, with the customary salute, a flag was raised on the newly erected flag pole.

Then the rain came: with a great scurrying the crowds sought shelter in the buildings, and entertained themselves in various ways. The size of the structure was strongly emphasized as the corridors, lecture rooms and auditorium took care of the huge congregation which shortly before seemed to fill the play ground. In the auditorium more extemporaneous talks were given and songs were sung while the storm continued. But it was over by five-thirty and as the trains had been held by the railroad companies, the visitors were enabled to leave comfortably and conveniently, and even refreshed and rested by the enforced sojourn in the buildings.

And when the children and their families and teachers had gone, and the College was again quiet, and seemingly deserted, everyone stopped for a moment, took a long deep breath, and began to realize things; first, probably, that he was finely sunburnt, and then that he was weary—more tired than he had thought—and, best of all, he began to realize more and more clearly and emphatically, what a great day it really had been.

MAINTAINING FARM FERTILITY

By Asa H. Smith
Clifton Springs, N. Y.

HOW to maintain the fertility of our farms and grow profitable crops is a subject which should receive most earnest study. Any system of agriculture which maintains the fertility of our best soils and increases that of our poorer soils is the one to be adopted by the practical farmer. The soil contains all the plant food necessary to grow profitable crops for centuries to come, but it is locked up in nature's store-house in such a way as to be slowly available for use. This is a wise provision of nature; without it the soil would soon be rendered sterile through man's wasteful methods in his efforts to supply himself with food. Anything which will add to this store or render it more available will aid crop production. To build up a soil that has been depleted in its fertility is a slow and tedious process. We are told to give extra tillage, use barn manures, commercial fertilizers, grow cover crops and so on through the list. The advice is good; and the results generally justify the advice, but when the labor and expense involved are deducted from the proceeds our faith is put to a severe test.

The average American farmer is wasteful of his inheritance. Except in few instances no great effort is made to increase the fertility of the land. His sole aim is to extract as much from it as possible with the least amount of labor and expense. The welfare of future generations does not concern him. One cause of this exhaustion of soil fertility is the system of farm renting. The tenant has no interest in the farm save in what he can get from it. Immediate returns are what he is looking for and when these fail to come he moves on again.

In our own farming operations we grow a variety of crops because we believe it to be a safe course to follow. The soil is a gravelly loam with a tendency towards dryness. A rotation of clover followed by corn or potatoes, then oats or barley and wheat have been the main crops for the past fifty years. During this time no special effort has been made to increase the fertility except through what might be called good farming, i. e. work well done. We have done nothing new or unusual; have no great array of figures to give; have simply followed the good old way of thorough cultivation, addition of barn manures, commercial fertilizers, rotation of crops, etc.

We may discuss the subject under the heads of tillage, manures, fertilizers, and rotation of crops. The first essential to tillage is good plowing. Without this all after work is done at a disadvantage. The furrows should be even and of uniform depth, covering all trash that may be on the surface. In the case of sod plowing we follow with the roller which presses the sods down firmly and enables the harrows to do better work by reason of a smoother top surface; but few air-spaces are left and a closer connection with subsoil water is made possible. The land is then harrowed until a fine seed bed is made. The ground for cultivated crops is plowed early if possible to admit working the soil to kill weeds. It is easier to kill weeds with the harrow beforehand than after the plants are out of the ground. The extra tillage gives a finer seed bed, the plants start quicker and stronger and all after cultivation is more easily done.

While we do not claim that the keeping of live-stock is necessary to the maintenance of fertility, we do believe that it is an adjunct to good farming and is a sure and safe course to follow. All straw, damaged hay, coarse fodders, etc, are fed to cattle of which from twenty to twenty-five head are fattened each winter, and the manures returned to the fields of which we cover from twenty-five to thirty acres each year. The profits

of the cattle feeding operations form a very small item in the cash account. Perhaps their owners are to blame for this state of affairs. They are kept for their company and their ability to eat. The advantage of adding manures to our dry soils is especially noticeable, probably because the water holding power is increased, chemical action by their decomposition set up, and fertility added. They also have a loosening effect on the soil and prevent its packing into a hard and dry condition. Some clay and gravel knolls which were formerly hard and difficult to plow have, by the addition of manures, been made quite easy to till. Commercial fertilizers containing only potash and phosphoric acid are used on the grain crops; sufficient nitrogen being added by the manures and growing clover.

A special effort is made each year to secure a good catch of clover. The seed is sown the latter part of March or first of April before the ground gets hard and dry. From eight to ten pounds of clover seed per acre is used. A light seeding of timothy is also applied at the same time, care being taken to secure good seed. The price should not be considered as much as the quality. It would be hardly reasonable to expect every seed to sprout or every plant to grow, so the necessity of good seed and heavy seeding is evident. Grass is nature's covering for the earth and should be encouraged wherever possible. The soil recuperates quickly under grass and manures seem to give better results when applied to grass lands than when applied to any other crop. When possible we put manure on meadows or pastures that are to be plowed the following year. It rots; and the growing grass takes up the fertility and quickly gives it up when plowed under. Eight acres of ground in 1900 gave only 900 crates of potatoes In the fall of 1905 a good dressing of barnyard manure was given, and the following spring a light application of fertilizer, and 1580 crates were produced. The same variety was planted and no better cultivation given. The only difference was that the previous crop was planted in hills and the latter in drills. The field was mowed two years and pastured two years. It probably would not be fair to assume that all the increased yield was due to manures and fertilizers as climatic conditions were better in 1906. Sometimes when grass is not wanted for hay it is cut and allowed to rot on the ground. This practice is even better than allowing it to fall down uncut as the weeds are destroyed and the new grass starts more quickly.

The question may be asked if the fertility of the soil can be kept up by the growing of clover and the addition of fertilizers along with good tillage. Our experience would justify an answer in the affirmative. We have a field of fifty acres some distance from the home farm that has been in our possession for twenty-five years and no manure has been applied either by use or the previous owner. The fertility has been kept up and even increased by rotations, clovers, good tillage and commercial fertilizers. Not only are larger crops grown, but the land is more easily worked, not being so hard and compact. Another farm has had no barn manures added for thirty years and the same story can be told. While this is by no means ideal treatment of farm lands it shows that fertility can be maintained and even increased in this way and at the same time profitable crops grown. It also has the advantage of requiring less labor; therefore being cheaper. A diversity of crops aids in this system, not because any less plant food is taken from the soil, but because each crop requires a different course of cultivation. The ground is stirred up admitting light and air, chemical action in the soil is hastened, and the growing grasses store up fertility to be given up later. Many of the fields and hillsides of New York state might better be growing pasture grasses than yielding the scanty returns in cultivated crops. The labor bill (which is no small item at the present time)

would be less and there is an increasing demand for meat and dairy products.

The farmer must give more attention to his soil. It is his bank and he can not make continual demands upon it and expect to have them honored. The old methods will not do. The Agricultural Colleges and Experiment Stations are pointing out the way and he who fails to take advantage of their teachings must be the loser.

THE WETHERSFIELD ELM

By S. F Willard, Jr., '08

IN beginning a series of articles which it is the purpose of the writer to prepare for the COUNTRYMAN, we take for this issue a tree which stands in the historic town of Wethersfield, Conn. As the town was settled in 1634 and this elm is supposed to be nearly as old as the town, it is at once an object of local interest and of intrinsic value to its inhabitants. The writer fully appreciates this as the tree stands not far from his home, so that, figuratively speaking, he has grown up under it.

This tree is supposed to be the largest elm in New England, and some authorities say in the United States. Be that as it may, the following measurements, which are accurate, speak for themselves: The tree at the base is 55 feet 6 inches in circumference and 39 inches up measures 26 feet and 4 inches. It is 125 feet high and has a diameter of spread of 137 feet making the circumference of spread 450 ft. It has 6 main branches the largest being 17 feet in circumference. At a distance of 25 feet from the ground there are 12 large limbs.

As to the age of the tree we must depend largely upon tradition, handed down by former generations. It is supposed to have been brought home by a young lad who carelessly pulled it up root and branch as he was driving cows from the meadows. So pleased was he with the grace of the sapling that he planted it where it now stands, little dreaming of its importance. Now two hundred and fifty years afterward it is highly prized as an old landmark as well as for its strength and beauty.

This large specimen of nature s work has sheltered many a weary traveller, being on the main road through the Connecticut Valley. No less a personage than Charles Wesley, the great reformer, delivered a sermon beneath it on his tour through the colonies about 1750. Undoubtedly Washington and Lafayette stopped to admire its beauty, while passing through the town on their way to Hartford to meet Rochambeau and plan the Yorktown campaign, for even then it must have been above the average in height and spread.

So interested are the townspeople in this landmark that recently at a town-meeting it was voted to appropriate a certain sum of money to preserve it for future generations, decay having set in and its life being endangered. Mr. L. H. Mead of Hartford, a practical forester was obtained to superintend the rejuvenation. What lies within the foresters' art can readily be shown by what has been accomplished in this instance. All broken or decayed limbs have been cut away to the extent of nearly six cords of wood. After cleaning out and cutting away all decayed substances from knots and holes a coating of thick paint was applied and the apertures were filled with stone and covered with cement shaded with lampblack, to resemble as closely as possible the bark. The application of paint was to prevent any moisture reaching the live wood from a vacuum under the cement caused by the expansion and contraction due to heat and cold. One large limb had been weakened and split so this has been

Photo by J. B. Standish Wethersfield, Conn.

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chained to another large limb, the chain being fastened by bolts passing through the limbs, the holes being bored by a specially made augur. Mr. Mead expects that decay will be arrested for years and the life of the tree prolonged as a result of his work.

We have become used to almost anything in the line of scientific development, but there is something almost divine in the fact that the dull ear of man has become keen to the mute appeal of sick trees and that they respond to his treatment. The lives of trees may thus be prolonged and their cool, protecting branches may continue to stretch forth in grace and beauty.

Other parts of the country may boast of their BIG TREES. Possibly this article may serve to awaken interest in them and their preservation.

EDITOR'S NOTE: Notes on larger elms and other large or famous trees will be gratefully received by the Editor of the *Countryman* and if of sufficient interest may be given space in the publication.

CHEDDAR CHEESE MAKING

By U. S. Baer

Sometime Secretary Wisconsin Cheese Makers' Association

THERE are many arts and branches of science which are intricate and very difficult to master. If there is one more difficult than another, the manufacture of cheese seems to excel them all. When we consider the effect of fermentation and bacterial influences, the unknown conditions of milk as received at the factories, the hidden power of rennet action and the intricate combinations which any or all these form to effect the final result, any attempt to fully describe and attach the proper importance to all the facts and principles which underlie cheese making is an undertaking beyond the knowledge and experience of the author of this article. I shall, therefore, merely describe an ideal American cheddar cheese for the home or domestic market and then proceed to describe briefly how it can be best produced.

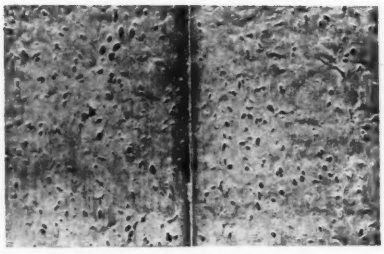
The recognized, peculiar and varied tastes of cheese consumers call for many different characters of cheese; but the cheese that commands the highest price in the markets of today is one of a clean, nutty flavor, flinty and close in texture, with a firm, meaty, solid, rich and buttery body. Cheese of such a character will keep a long time in prime condition, and if cured under the most favorable temperatures will improve in quality up to twelve or more months.

Fancy cheese cannot be made from filthy sour milk. In the handling of pure, sweet milk, the whole mass collected in the vat is gradually warmed up to 86° F., when the milk is tested (by means of either the rennet test or the acidimeter) for ripeness, and if sufficiently matured, the color and rennet is added at once. If the milk is insufficiently matured from one to two percent starter (commercial pasturized) is then added, and the milk allowed to stand at this temperature until a sufficient amount of acid has developed so that the curds will show one-eighth of an inch of acid when applied to the hot iron or .20 percent acid by the acidimeter, within two hours from the time of adding the rennet at which time the whey should be removed.

None other than harmless or vegetable color should be used and in any case should be thoroughly incorporated with the milk before the addition of the rennet. The latter should be added in sufficient quantities to cause the milk to coagulate ready for the knife in from twenty to twenty-five minutes; it should be diluted with about fifty times its own bulk of cold water and added to the milk in such a way that the coagulation will be uniform throughout the whole mass.

When the curd breaks clean across the finger and is sufficiently firm to stand up before the knife, it is ready for cutting. Great care should be taken to secure an "even cut" so that the curd particles will be uniform in size. Every piece of curd in the vat should be warmed alike. The center of each piece should be just as warm as the outside. As curd is a poor conductor of heat, this condition can be secured only by raising the heat slowly and steadily. The effect of heating rapidly is to cook the outside of the larger pieces of curd faster than the inside. This contracts the surfaces and confines the whey in the center. It would be preferable, if possible, to heat the inside of the cubes the faster, driving the whey to the surfaces; we do not want to do either. We want an even uniform cook.

One of the most important steps in the process of cheesemaking is to know when a curd is properly cooked or firmed. The real condition can hardly be described in words, but the cheesemaker must learn to recognize it by experience. This is a part of the cheesemaker's art. The curd should not be salvy and soft, but springy and



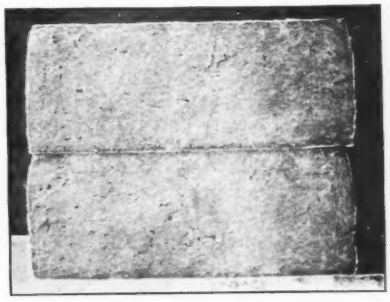
Bull. 83, B. A. I., U S. D. A.
CROSS-SECTION OF CHEESE MADE FROM UNCLEAN MILK SHOWING GAS-HOLES

elastic. The most convenient and sure test is to take up a large double handful of the curd and compress it dry of whey. After a minute remove the pressure. If it falls apart readily and the particles resume their former shape and size, it is very good evidence that the curd has been properly firmed.

We should then have one-eighth of an inch acidon the curd (or .20 percent acidity as shown by the acidimeter) and draw the whey. When the whey is allowed to remain too long with the curd, excess acid is developed, and a dry, mealy cheese is the result. There will also be a great loss of fat. If the whey is drawn too early, a soft mushy article will be produced. The necessity of diligence and care in this branch of cheese making is of vital importance in order that the separation of the whey may be the most perfect possible.

From thirty-five to forty-five minutes should be consumed in raising the temperature to 98 or 100 degrees F., as the case may be. To assist the curd in heating evenly and keep it from matting together, it should be stirred from the time it is cut until the heat is shut off. The automatic curd agitators now on the market are preferable to the hand rake commonly in use.

When the required amount of acid has developed in the curd, the whey is drawn, and the curd dipped upon racks where it is left to drain and mat, having uniform depth of about five inches. If the curd has been properly firmed in the whey, it will not require any stirring at the time of racking, for this means an additional loss of fat and solids. As soon as the mass is matted sufficiently so as to admit of its being turned over without crumbling, it should be cut into blocks of sufficient size for handling and turned over, repeating the process every few minutes, always with a view to perfect drainage. The best textured, close, firm bodied cheese is that made from curd that has been piled but very little, or not at all. If curd is piled, it is important that the outside pieces be folded into the center of the pile each time to insure an even color and uniform temperature of from 96 to 98 degrees F., throughout the mass. When the curd is sufficiently ripened or matured for milling, it becomes stringy or meaty, and when pulled apart splits instead of breaking. In cutting through the mass, the color should be even, with no white spots showing. At this stage of the process, when the curd is in normal condition, it will probably have at least one inch of fine siky threads when applied to the hot iron and will show from .70 to.85 percent of acid by the acidimeter. The acid should be well developed at this stage of the process, but the amount of acid is not so important as that the curd should be meaty in texture. Knife mills ought always to be used as peg mills tend to bruise and



Bull. 83, B. A. I., U. S. D. A.
CROSS-SECTION OF CHEESE MADE FROM CLEAN, SWEET MILK

tear the curd, injuring the texture and causing unnecessary loss of butter fat.

After the curd is ground, it is kept sufficiently stirred to keep the particle from matting together again. A further maturing of the curd takes place, during which it takes on a peculiar flavor resembling the odor of clean, rich, ripe cream when ready for the churn. It is extremely difficult to convey in words to the minds of others a definite idea of that peculiar condition characteristic of curd when ready for the salt. That is to be gained through experience. However, resort is had to the hot iron test which furnishes us with two species of evidence. If when a portion of curd is applied to the hot iron, it will string nice and silky, and if when so applied it emits an odor like nice toasted cheese and does not smell like burnt hair it is usually ready for salt. The drippings from normal curds at time of salting will usually show from 1 to 1.2 per cent acidity when tested by the acidimeter. Still these tests are not absolutely reliable in all localities and under all circumstances. Another method of gaining the desired information is by the sense of feeling and the condition of the moisture which oozes out between the fingers when the curd is squeezed in the hand. The curd when ready to salt should not feel harsh, but soft and velvety and will exude a moisture of half fat and half whey. When salted, a clear brine should run from the curd. The temperature at time of salting should not exceed 90 degrees F. After the salt is added the curd should be spread out thin, so that it will cool off, and when it is put to press should be at a temperature of from 75 to 85 degrees F. If the curd is put to press too warm, the fat is more easily pressed out and lost.

With the majority of the rank and file of cheese makers, it is not necessary that much should be said about the hooping and bandaging of cheese. The careful, painstaking maker is an artist in a way, and takes great pride in turning out a neat appearing cheese, symmetrical in form, neatly bandaged and perfectly closed on its surfaces. Still we often, too often, find makers who are slack in this very important part of the work. They have more or less difficulty in getting their cheese properly closed. This is true of some makers even when the curd is in the most perfect condition for pressing. Through negligence, they permit the press cloths to become stiff and full of whey while the hoops are not always kept scrupulously clean. No amount of pressure will secure a good rind if the press cloths and hoops are not in first class condition. If factory operators were to exercise more care and devote more time and attention to the work of hooping and dressing the cheese, there would not be so many goods upon the curing tables with checked rinds and showing free fat under the bandages.

At the time of turning the bandages all the whey should be rinsed out of the press cloths by dipping them in scalding water and placing them again upon the cheese as hot as possible. In the morning, the cheese ought always to be turned end for end in the hoop. When taken out they should be examined carefully to see that they are perfect in shape, and all defects remedied. Then pour water sufficiently hot to melt all free fat that may have accumulated under the circle cloth and bandage, over the cheese again before applying the pressure. This warming of the surfaces aids in the formation of a firm, transparent rind and prevents the cheese from checking. It also improves the appearance of the cheese.

With cheese as with anything else we must try to please the eye. Marketing cheeses that are of unequal height or lopsided from some defect or carelessness in the making is always poor economy. Let us remember that cheese is an article of food, and that it should not only be put up in a neat, attractive form, but also that it should not come in contact with anything having a bad odor.

Recent experiments by Drs. Babcock and Russell and the United

States Government have demonstrated that the quality of cheese was best when cured at temperatures ranging from 35 to 40 degrees F., or thereabouts. Cheese cured at 50° F. were better than those cured at 60°F. Cheese cured at 60° F. were better than those cured at 70° F. This leads us to believe that much lower temperatures than have heretofore been thought advisable in ripening cheddar cheese may be used with very considerable success. The dipping of cheese in hot paraffine will add to the attractiveness of the goods, and tend to prevent mold growth and excessive shrinkage in storage.

WILL I GO TO THE FAIR ?

By Lalia Mitchell

"Will I go to the fair? Do I go to the fair?
Why, surely you'll see me if you should be there.
For this is as certain as darkness and light;
A farmer's hard-working, but this is his right:
To take a day off when the harvest is won,
To take a day off when the farm work is done,
To go with a heart that is free as the wind,
To go with a conscience as clear as you'll find;
And know that he's monarch of woodland and soil,
With all the world richer because of his toil.

Will I go to the fair? Do I go to the fair?
I've three shorthorns entered and I shall be there.
No operas tempt me the whole winter long;
The seashore in summer I'd sell for a song.
But this is my playhouse; the barn and the shed
And houses where poultry are sheltered and fed.
And this is my playtime, the fall of the year
When maples are crimson and meadows are sere,
And never a man in the wide world can say
He's freer or gladder than I am today."

—*American Agriculturist.*

POULTRY AT CORNELL

Tune—"Landlord Fill the Flowing Bowl."

Come friends and listen to my tale
Of chickens kept "in clover";
And students crammed so full of sense
Their brains are brimming over.

CHORUS—
Come boys and girls and take your turn
'Tis said we ever live and learn,
So hunt the spot where genius burns
And chickens live "in clover."

'Tis said that "Jimmie's "passing kind
To all who shirk not labor;
And Rogers, always at his post,
Brings *colored eggs* in favor.

When "Short Horn" hordes the camp invade,
A busy man is Lawry.
The ladies always join his class—
But that's another story.

For systematic sleeping, too
The reading room is handy—
And if the students wish to spoon,
Blind chaperons are dandy.

The ancient art of hatching chicks
Is taught to all new comers.
Who wants a brood from china eggs,
Should just apply to Somers.

For feeding chicks and feeding hens
'Tis Krum and Grubbs, Instructors,
While Boicourt tends experiments
With always best of luck, sirs.

Ducks, rainbow hens, athletic chicks,
And people wise to mind 'em,
And Easter eggs and *lots of work*—
Here, studes, is where you find 'em.

CHORUS—Come boys and girls, etc.

—*Anonymous.*

Note: Inspired by the season of 1907–8 in the Department of Poultry Industry.

THE LONG COLONY HOUSE.

THE SURVEY WORK OF THE COLLEGE OF AGRICULTURE

THE last legislature appropriated $10,000 to extend the extension work of the College of Agriculture. A certain part of this fund has been set aside to extend the various kinds of agricultural surveys in which the College has been interested for some time. The surveys that are now under way are of four main types:

The Tompkins County survey, which was begun two years ago, is to be completed this summer. An economic and social census had been taken of about 950 farms and it is hoped that the remaining farms in the county will be completed before the season closes. This is the most thorough survey that the College has ever undertaken, inasmuch as it attempts to cover not only all the products of the farm, but to find out something about the general status of the farmer and the character of the community. An article on the work so far prosecuted was published in the *Independent* of September 3rd by Dean Bailey under the title "The Farmer at Home."

The second type of survey is the extension of the pomological inquiries that have been under way for some years. These were begun years ago by Dean Bailey, who was then Professor of Horticulture. They were continued later by Dr. Warren in Wayne and Orleans counties and have been continued since then under the general direction of Professor Craig. Niagara County has been completed, and the results will soon be published. Orange county also has been completed. This year parties are out under Professor C. S. Wilson in Ontario and Monroe counties and it is expected to complete them this year. These parties consider the fruit-growing interests alone, although they correlate these interests with soil conditions and other circumstances.

The third type of effort is the soil survey, which is under the charge of Professor Fippin, and in co-operation with the Bureau of Soils, U. S. Department of Agriculture. Livingston and Montgomery counties are being surveyed this summer. Mr. Crabb is in the field with the parties.

The fourth survey is a study of the trucking interests in Long Island in charge of Professor Judson. He has been in the field during the month of August. Heretofore the college has not taken up the vegetable-gardening interests separately, but this beginning has now been made and it promises well for an extension of the work.

The Cornell Countryman

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OCTOBER, 1908

Greeting

In welcoming the class of 1912 for the first time, and the classes of 1911, 1910 and 1909 for the second, third and fourth, respectively, the Countryman greets them, as always; as a phase of the life of the College that is here to see them come and go, but which, while they are here, is also, of them, theirs. It greets them as a friend ready to assist in every way within its power, whether to publish the ideas of one individual or to endeavor to express the sentiments of many. And it greets them as a dependent activity, relying upon their support and their co-operation. On this last relationship do we lay especial stress and emphasis for the Countryman needs the backing of every student in one form or another, and of all alike in the form of suggestions, criticisms and advice toward its improvement. We repeat, once again, therefore, to one and all, our invitation to visit the office, to get familiar with its aims and its activity, to suggest and criticize and in general, to "talk things over."

To the Freshmen, in particular, a few words of information may not be out of place. There are in the College a number of activities of which this paper is one and several facts which you must recognize and accept as such as you become factoral units in the college. One of these facts is the Honor System with which you should speedily become acquainted. Opportunity is given to all to become familiar with its articles, and ignorance is not accepted as an excuse thereafter. In 1907, the student body decided to do away with the practice of cribbing and as a result the following conditions exist: Work in the college is conducted under the Honor System, at the desire of the majority of the students, and only to those men who intend to uphold this system and its principles is extended the hand of friendship. The effectiveness of this system has been proven; it is now in your hands—from the graduate student to the freshman.

You are advised and urged to enter at once some University or College activity, be it athletic, literary or along the lines of clubs, associations, etc. For practically each branch of the College there is such a club—the Lazy Club in Horticulture, the Round-up Club for Animal Husbandmen, the Poultry Association, and then the Agricultural Association of which every person in the College is theoretically a member. Let it be seen, in *your* case, that the membership is more than merely theoretical. Finally, there is the Assembly, a general informal gathering on the first Thursday of each month, when the characteristic spirit of the College is diffused more widely and its sinews drawn more closely together, till a unity and an organization has been reached, which can be surpassed, we are confident, by no similar institution. These, in brief,

are your opportunities. They are yours during your college course, and we can only urge you to take advantage of them, knowing that their influence will aid and inspire you for many more than the number of years during which they are offered you.

"Some are born great,

OTHERS achieve greatness, while others have greatness thrust upon them."

The life of Dean L. H. Bailey has been one of the achievement kind, until now it has come to pass that greatness is being "thrust upon him." At least, this latter fact is what we glean from the daily news journals in their accounts of the progress of President Roosevelt's Commission on Country Life. At any rate the Dean has accepted the leadership of the commission, and if we may criticize, we congratulate Mr. Roosevelt upon his choice, and his successful acquisition of the services of one whom we know as *the* representative of modern agricultural knowledge and its dissemination. For the Dean, we are, of course glad, as his every success and recognition brings to the college no small degree of gratitude and satisfaction. This commission has no small nor simple task before it, but it is in good hands and its accomplishments may have directly or indirectly, vast influence upon the development of the rural districts in the coming years.

Modesty?

MODESTY is one of the virtues, and the hiding of one's "light under a bushel" may often be an expression of this virtue. Yet we question whether it is as much modesty as lack of interest that keeps the alumni so quiet, so reticent concerning their whereabouts and their activities. We have been told that the column of former student notes is of considerable interest to many subscribers, and we trust that this is so. But we wonder whether those same subscribers realize that it is only with their co-operation that we can maintain that department at all. Of the half-a-hundred graduates of 1908, we have heard of perhaps half a dozen and no more. What little news we have gathered this fall has come mainly from the Professors of different departments. This is not as it should be, nor, we hope, as it will be. Once more we urgently request, that former students will let us hear from them and of their alumni friends often. A few words on a postcard may not mean much at your end, but they can prove of considerable help to the COUNTRYMAN and to those who are working for it.

Progress

IT is a source of pride, and rightly, to every poultry student, that his department was so distinctly recognized in the work of the Graduate School of Agriculture, this past summer. The attendance at lectures upon various phases of the subject was gratifying and the nature of the discussions clearly proved the worthiness of Poultry Husbandry for the place it occupied. That a department so young, a subject that has been taught and recognized as an important individual for so few years, should at this early stage in its development,

offer material and problems of graduate school calibre is both remarkable and significant. Its rapid progress seems closely comparable to the gigantic strides that this University has made into the light of public and national recognition and on closer observation it seems clear that this comparison *should* logically exist. If Professor J. E. Rice, of the Department of Poultry Husbandry, in any degree typifies Cornell spirit and energy—and on that point we have some definite and distinct opinions—no less does the growth of Poultry Husbandry investigation and knowledge reflect his personality, his influence, his unceasing activity in the advancement of his subject.

To Graduate Students

In the spring of 1908, shortly before commencement, the graduate students of the College conceived the idea of associating, for the purpose of unification and increased efficiency, as a body. As the time was short, but little was done, but the idea has survived, and within a short time matters will begin to take definite shape. To all students taking graduate work in this college an invitation is extended by the leaders of the movement to co-operate and make the Society a reality. Notice will shortly be given of a meeting at which plans will be fully discussed, a constitution drawn up, and permanent officers elected.

GENERAL AGRICULTURAL NEWS

THE College of Agriculture was represented at the State Fair at Syracuse, September 14–18, by means of the exhibits of several of the departments. The Department of Poultry Husbandry which had previously exhibited at the Ithaca and Trumansburg Fairs, presented an interesting collection of models of houses, drawings of the construction of various buildings, incubators, brooders, etc., and many other features of the department's work, which were both interesting and educational.

The Soils Department exhibit dealt almost wholly with the drainage problem, various materials being shown and methods illustrated in miniature. This made a rather unique showing as it is the first of the kind ever put out by the department and emphasizes the increased attention that is being given to this important subject.

The Animal Husbandry exhibit was small but was "out for blood," as Professor Wing had entered several of the best pigs from the University farms and at the time of this writing was optimistic in regard to prizes.

The Department of Agronomy's exhibit was rather extensive, covering several phases of work. There was an interesting display of the varieties of corn grown on the University farms, some thirty-eight in number and samples of ensilage corn in different stages of development in order to emphasize the correct time for cutting and filling the silo. Tests of seed corn, both loose and ear samples, and germination tests of clovers made interesting material, and related to the latter were various studies of the root nodules on different legumes.

Mounted specimens of a large number of pasture and hay grasses as well as those used in the Experiment Station's co-operative experiments gave an opportunity for becoming familiar with a greater variety than could ordinarily be observed in the field, and a similar exhibit of common weeds emphasized the size of the army that the farmer continually has to fight.

Alfalfa was not neglected and specimens of good and poor soils for this crop attracted attention. Finally, this department added to its exhibits short talks illustrated by lantern slides given every half-hour. Two important subjects alternated in these talks, "Silage Corn" and "Abandoned Farms," being enlarged upon by members of the departmental staff.

The Plant Pathology department also presented an educational exhibit dealing with the more common and more serious plant diseases, and the best methods for their control.

There was sent by the Dairy Department a Babcock Testing outfit upon which demonstrations were given. A large collection of different style, small top milk pails; bacterial cultures to show the relative numbers of bacteria in clean and unclean milk, and various other preparations illustrating the effects of the different types of change producing organisms on milk.

* * *

An interesting and important series of meetings was held at the College of Agriculture on July 23, 24 and 25, when after an International Conference of Instructors and Investigators in Poultry Husbandry, an International Association was formed. There were about thirty charter members and the officers were elected as follows: President, W. R. Graham, Canada; first vice-President, James Dryden, Oregon; second vice-president, Raymond Pearl, Maine; secretary-treasurer, J. E. Rice, New York; directors for two years, Horace Atwood, West Virginia; J. P. Kerr, Mississippi; S. T. Campbell, Ohio; directors for one year, R. C. Pierce, Iowa; R. R. Slocum, District of Columbia.

The five sessions of the conference were exhaustive in their treatment of the various phases of Poultry Husbandry, and interesting discussions were maintained after the presentation of papers by a number of the chief instructors and investigators of this country and Canada.

CAMPUS NOTES

Students of the College will hear with interest that the University farms have been increased by the purchase of some four hundred acres of land adjoining the present farm. The greater part of this newly acquired property is composed of the Gleason farm (sometimes called the Cyclone Smith property), which lies directly east of and adjoins the Mitchell farm; the Blair property, lying to the south of the athletic field and the Roberts pasture, and the Frank C. Cornell property surrounding the East Ithaca Station. While no crops have yet been started on this land, hay has been cut from it during the summer, and it will probably soon be given over to experimental work.

Also of interest is the fact that one hundred acres of land on Bald Hill have been purchased by the Veterinary College, to be used in its work.

* * *

The spring elections to Hebs-sa, were published in the *Sun* as follows: E. I. Bayer, J. H. Miller, E. W. Mitchell, E. G. McCloskey, H. I. Seely, E. L. D. Seymour, C. J. Stein, E. H. Thompson, S. F. Willard, Jr., and R. L. Rossman.

* * *

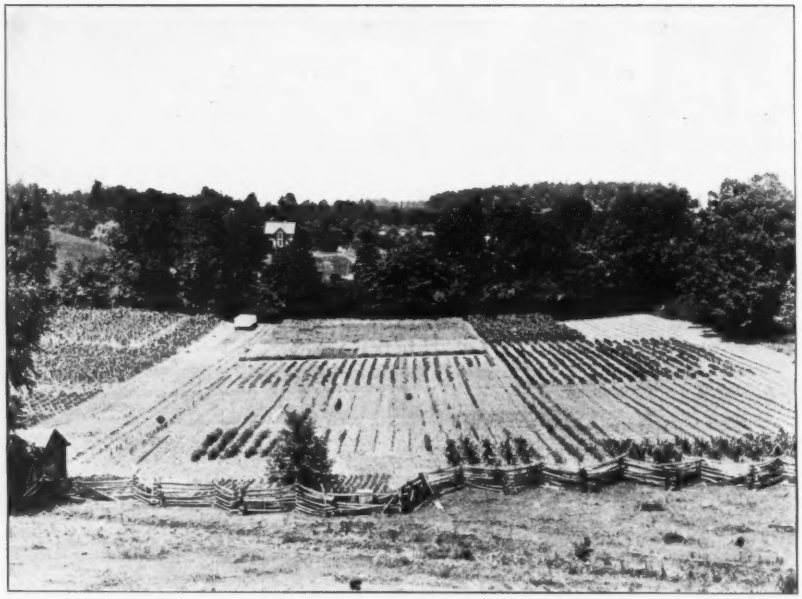
Professor and Mrs. Comstock who left early last spring for Europe, returned August 1st after a very enjoyable trip. They spent the remainder of the summer up the lake.

* * *

Professor John Craig having recovered from his severe illness in the spring, continued his European trip and returned September 7th, to resume his position as head of the Horticultural Department.

* * *

Mr. A. D. Taylor, '06, formerly instructor in the Department of Rural Art, has left the college to take a position with Warren Manning, the landscape architect.



THE PLANT BREEDING EXPERIMENTAL GARDENS

The Extension Department has been particularly active this summer, for besides having carried on its correspondence and co-operative work, it maintained for four weeks in co-operation with the Chautauqua Institute, a school for teachers. Instruction was given in Nature-Study and Practical Agriculture, and supplementing the latter work experimental gardens were put in the hands of children of the locality. Professor Tuck, Miss McCloskey and M. P. Jones, '08, who has joined this department, composed the regular instructing staff, while Professor Rice journeyed to Chautauqua to give a special lecture.

* * *

The Rural School Leaflet, edited by Miss McCloskey has been increased in size to thirty-two pages. Of these twenty-four will be for the teachers and the remainder in the interests of the children. The magazine will aim to help both classes of readers to a better knowledge of practical agriculture, each according to its needs.

A new and interesting series of experiments has been begun by Professor T. L. Lyon, on a somewhat large scale. A part of the farm land has been reserved for this department, and a series of concrete tanks have been constructed that are to remain for some years. The following description which accompanied plans of the tanks and was published early in the summer explains in detail their construction and purpose: "These tanks are now in process of construction. They are intended to furnish receptacles for bodies of soil of sufficient size to produce plants in a normal manner under approximately field conditions, and yet afford opportunity for measuring a large number of the factors affecting plant growth. The construction is of concrete, but the tanks will be lined.

Each tank is 4 feet 2 inches square with a maximum vertical depth of 4 feet 6 inches and a minimum depth of 4 feet. There are 24 tanks placed in two rows of 12 tanks each. Between the rows of tanks is a tunnel the bot-

tom of which is 10 feet below the top of the tanks. The tunnel is six feet wide. From the lowest point in each tank is an outlet tube 2 inches in diameter and tin lined. It is made large enough to permit of easy cleaning and has no bends in it. A piston runs through the tube to within 4 inches of the upper end. Between the perforated head of the piston and the soil glass wool is to be inserted. The piston can be withdrawn if it is desired to clean the tube.

Drainage water from each tank will be caught in a receptacle in the tunnel. The lining in the tanks will prevent any soluble material in the concrete from appearing in the drainage water. A constant water table at the depth of 4 inches may be maintained by raising the rubber tube leading from the outlet tube to a point 4 inches below the surface of the soil in the tank.

The soil will be placed in the tanks with the same relation of surface to subsoil that occurs in the field. Analyses will be made when the soil is installed and afterwards left undisturbed for a period of several years. The purpose in constructing this apparatus is to obtain a record of the performance, properties and composition of the soil during a long period of time."

* * *

With the continued growth of the Departments of Soils and of Plant Industries, there have been necessitated extensive changes in the Agronomy Building. New laboratories are being constructed in the basement formerly occupied by Farm Machinery, and in other parts of the building for Dr. Duggar and Professor Lyon. And at the same time congestion and lack of adequate laboratory room is still felt as the classes increase in numbers.

* * *

The new Plant Breeding Garden shown in the illustration on page 26, which now occupies the ground formerly sown to alfalfa has been one of the most interesting parts of the farm during the summer. While the experiments with corn, potatoes, summer and winter wheat, etc., have but just begun, care of the crops and crossing experiments have kept several men busy throughout the season. It is expected that the gardens will be maintained on this spot for some years.

* * *

Professor J. L. Stone of the Department of Farm Practice left for England on August 8th, intending to combine a vacation with the interests of the College. He is expected to return some time during October.

* * *

Mr. Huber Shull, a graduate of the Michigan Agricultural College, has joined the staff of the Poultry Department and will conduct various investigations throughout the winter.

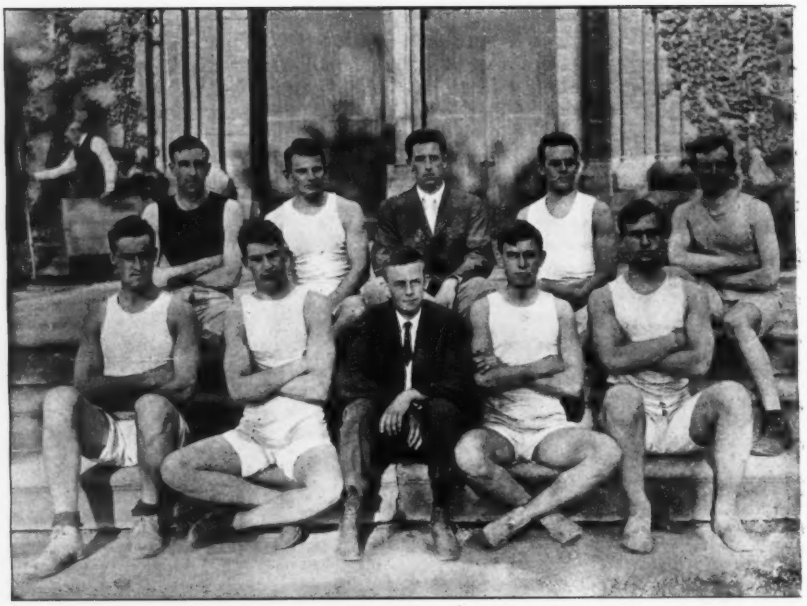
* * *

Professor M. B. Thomas, '90, and his wife visited Professor Whetzel for a week during August. He is still at the head of the Botany Department of Wabash College, Crawfordsville, Ind., where Professor Whetzel, Mr. Reddick and Mr. Barrus of this college formerly studied under him.

* * *

The Soils Department has been carrying on two important investigations during the summer under the direction of Professor E. O. Fippin of the Department. The first is a series of co-operative soil surveys, which will probably continue throughout the fall.

In Livingston County, M. E. Carr, of the Department of Agriculture, at Washington, and G. A. Crabb, P. O. Wood, '08, and H. O. Tiffany, '09, of the College, had completed three hundred square miles of territory on September 1. In Montgomery County, Ora Lee, '06, and C. Lounsbury, '08, are doing similar work and on September 1 had covered one hundred and twenty-five square miles.



AGRICULTURAL CREW, 1908.

Cook	Livermore, (Capt.)	Seymour, (Mgr.)	Centurion	Thomson
Hollister	Salisbury	Judd, (Cox.)	Kenyon	Bromley

The second phase of the investigations of this department is in the form of experiments with fertilizers on muck soil, where onions are being grown. This work is being done on the Breeze Hill farm in Orange County, owned by Mr.W. B. Howland of the Outlook Company and managed by J. B. Shepard, '06. Mr. Shepard reports that interesting variations in growth are noticeable and further results are expected when the crops are harvested.

* * *

Mr. E. S. Guthrie, a graduate of the Iowa State University, who has been in the Dairy Department of the Ohio State University for the past two years, is to be Instructor in buttermaking during the coming year.

* * *

Professor E. G. Montgomery, of the Nebraska Station, spent two months of the summer at Cornell working in the Departments of Soils and Plant Breeding.

Professor R. A. Emerson, Horticulturist in the Nebraska Station, also spent two months here in Dr. Webber's department. His investigations were chiefly with Petunia crosses, having in view discoveries regarding the inheritance of color.

* * *

Professor J. B. Norton, formerly of the Plant Breeding Department, has again joined the U. S. Department of Agriculture.

Dr. Webber has added to his staff as Assistants, F. J. Pritchard, A. W. Gilbert, H.H. Love and E. P. Humbert. Together with E. C. Ewing, '08, these men have been conducting investigations during the summer. Mr. Gilbert, who has already held the position of Professor at the Maine Agricultural College, will conduct the introductory courses in Plant Breeding, while the other assistants will be more closely connected with the Experiment Station and its work.

The timothy experiments which have been running for two years on the grounds east of the Roberts pasture are showing marked and interesting results. There has been considerable trouble caused by rust, but this has unexpectedly brought to light some interesting and valuable differences in the degree of rust resistance in the varieties being tested. Certain rows are found to be almost exterminated while others close by are practically free from the disease.

* * *

The Department of Plant Pathology under Professor H. H. Whetzel has been active throughout the state in sending educational exhibits to several county fairs. Besides the State Fair at Syracuse, it has been represented at the Union Fair at Trumansburg, the Chautauqua County Fair at Fredonia, the Genesee County Fair at Batavia and the Steuben County Fair at Bath.

* * *

This department has maintained its field station for the investigation of Black Rot of Grapes at Romulus, during the summer, where the work has been in charge of Mr. Donald Reddick.

* * *

There has also been a new field laboratory established at Oneida for the purpose of studying Bean Anthracnose. This has been under the direction of Mr. M. F. Barrus, who this winter joins Professor Whetzel's staff as assistant. Mr. Reddick, who last year held this position, has been advanced to Instructor.

* * *

The Department of Agronomy has taken as assistants for the following year: E. H. Thomson, '09, K. C. Livermore, '09, and C. M. Bennett, Sp., who together with F. E. Robertson, have been completing the Tompkins County Survey work which the department has been carrying on for some years. The remaining townships of Ithaca, Dryden, Lansing and Danby will be covered, it is expected, by the end of October.

We are glad to announce the marriage of Mr. Savage, of the Animal Husbandry Department, on September 7.

* * *

Besides the exhibit made at the State Fair, the Department of Animal Husbandry showed eighteen cattle, ten horses and ten sheep at the Tompkins County Fair.

This department now has about eight new teams one of which is a pair of pure-bred Percheron fillies, bought by Professor Wing, especially for the department.

* * *

Plans for the new greenhouses, for which $30,000 was appropriated last winter, have been drawn up and are now in the hands of the State Architect. It is expected that these buildings will be located directly east of the dairy building extension, and it is hoped that their construction will be begun in the near future.

These greenhouses are designed to furnish practical laboratory space for all the Plant Industry departments. The Horticultural Department will probably occupy the largest single amount of space, while the Plant Breeding, Agronomy, Soils, Plant Physiology, Plant Pathology and Nature-Study Departments will share the remainder.

* * *

Extensive improvements and changes have been made in the Dairy Building during the summer. A steam laundry equipment complete in every detail has been installed for the use of the College. The upper floor of the Dairy Extension has been remodelled to provide a laboratory and a reading room for the Poultry Department. This will give both increased room and increased lighting facilities, besides permitting the former laboratory in the Poultry Building to be used for other purposes.

The top floor of the Dairy Building itself has also been considerably altered to provide draughting rooms for the courses in drawing now offered by the

College. The space has been partitioned off into three rooms, an office with dark room adjoining in the south east corner, a large draughting room west of this and a still larger draughting room occupying the remainder of the floor. In addition a cloakroom has been partitioned off to the right of the stairway. The high ceilings and roominess of this part of the building particularly adapts it to its new uses, and with the new sky-lights which have been installed, the lighting facilities have been greatly augumented.

* * *

In order to permit Mr. G. M. Lauman, to give all of his time to his classwork in Rural Economics, Dr. W. A. Riley has been appointed Registrar of the College, and will assume the duties formerly imposed upon the Secretary.

* * *

Two recent advancements in the faculty have resulted in Assistant Professorships for C. A. Rogers, formerly Instructor in Poultry Husbandry and P. W. White, formerly Instructor in Agronomy.

FORMER STUDENTS

H. G. DOUGHTY

'08, Special—Herbert Gardner Doughty died suddenly at his home near Speedsville, N. Y., on August 21, after a three days illness. He was born in May, 1885, on a farm and attended the Newark Valley High School for two years coming thence to Cornell for the Winter Course of '06–'07. The next fall he registered in the two year special course, taking most of his work in the Poultry Department.

'04, B.S.A.—A. R. Mann, who last spring joined the Dairy Department of the College is now Private Secretary to Commissioner of Agriculture, R. A. Pearson, '94, at Albany.

'08, B.S.A.—A. W. McKay worked in the Orchard Survey of the State during the summer, and early in September left for Washington to take up his position in the Fruit Storage Division, under G. H. Powell. He expects that his work will take him first to Florida, and later in the winter to California.

'08, W.P.—W. A. Lippincott who was President of the Short Course Poultry Class is now Assistant at the Iowa Agricultural College at Ames. We are glad to announce that on August 25, he was married to Miss F. O. Humphreys of Elmwood, Illinois.

'05, B.S.A.—James G. Halpin, who has been on the instructing staff both here at Cornell and at Rhode Island, is now Assistant Professor of Poultry Husbandry at the Michigan Agricultural College. On July first he was married to Miss Ione Blake of East Lansing, Michigan.

'05, W.—M. F. Barrus is to be Assistant in Plant Pathology this year while working for his Ph.D., under Professor Whetzel. After his short course here, Mr. Barrus entered Wabash College and completed the four-year course in three years. While there he won the Eastman Biology Prize with a paper upon Bean Anthracnose and later was elected to Phi Beta Kappa.

'08, B.S.A.—Errett Wallace has been working under Professor Whetzel during the summer, upon Apple Scab and the Bulb Rot of Gladioli. The latter investigation he has taken as a major subject for his M.S.A.

'08, B.S.A.—J. Taubenhaus has continued his work upon Hollyhock diseases in the Plant Pathology Department, having chosen this subject for his M.S.A. investigations. The department has maintained a large plantation of several thousand hollyhocks south of the athletic field for use in this work.

'06, M.S.A.—J. E. Howitt of the Botanical Department of the Ontario Agricultural College at Guelph, spent July here carrying on work in Plant Pathology.

'06, W.P.—We learn with pleasure that M. P. Burdick has also taken the preliminary step in "settling down." On August the twentieth, he was married to Miss Ethel M. Wight of Auburn N. Y., where he will be "at home, Franklin Street Road, after September first."

'05, W.P.—"And still they come!" E. E. Britten announces that in April, 1907, he was married to Miss May M. Brownell of Syracuse. Another case where the good news is "better late than never."

'84, B. S. A.—Since his graduation from Cornell in 1884, J. B. Burrows has been engaged in horse farming at Decatur, Ill. He also holds the responsible office of Director of Illinois Farmers' Institutes and is one of a committee of five appointed to investigate ways and means of improving county farmers' institutes. These duties require a considerable amount of his time especially during the winter months.

'08, W.—Roy H. Chamberlin is located on a farm consisting of about 80 acres which he has purchased near Caneadea, N. Y. At present he is practicing mixed farming but expects later to make potato growing a specialty.

'08, W. P.—Walter H. C. Ensign orders his COUNTRYMAN sent to Brook Hill Farm, Genesee Depot, Wis., where he informs us that he is employed.

'00, W.—R. E. Church, since leaving Cornell, has had charge of the butter and buttermilk department of Borden's plant at Oxford. His continuous employment by this company for six years is evidence of his success in his chosen line of work.

This spring, however, because of ill health resulting from pneumonia, he was advised to give up his trade for a time at least. Last April, therefore, he purchased and took charge of a squab industry in Sidney where he is at present located and is making very good success at the work although he states that butter making seems to be more to his liking and that he expects to return to his chosen vocation this fall.

BOOK REVIEWS

The Romance of the Reaper. By Herbert N. Casson. Illustrated. 5 x 7½ inches. 200 pages. Doubleday, Page and Co. New York. Price $1.00 net.

Mr. Casson has given us in this little book, a fascinating and readable account of the growth of a great industry. The story of rugged warfare between early manufacturers and of the formation of a great combine, the biographies of the pioneers in the making of harvesting machinery, all these are presented in such a way that one wonders that more romances, more novels and more dramas have not been woven about the days and the activities that have meant so much to the farmer and the country. If the story is made occasionally almost too novel-like in style, and if here and there spectacular descriptions and expressions are used to emphasize the size and importance of our grain producing industry, there is nevertheless an air of straightforwardness, of fairness to both sides and to all parties, as well as the impression of accuracy which personal acquaintance with one's subject promotes.

In the "Story of Deering" and the "Story of McCormick," the author traces the birth and early growth of the invention and production of harvesting machinery. Later in the "Story of the International" and chapters on the "American Harvester Abroad" and the "American Farmer and the Harvester," Mr. Casson has connected those beginnings with the progress of today, and has clearly outlined the marvelously important part played by the American farm mechanics, in the work of supplying the world its grain.

If you are looking for inspiration from the life and struggles of sturdy American workers, and if you wish to be interested in, and appreciative of, one phase of American industry and energy, you will find this book worthy no little commendation.

The State and the Farmer. By L. H Bailey. 5½x7½ inches, 185 pages. The Macmillan Co., New York.

With characteristic absence of fatigue, Dean Bailey has found time during the past winter to broaden and enlarge his speech delivered in Lansing, Mich., in 1907, into this intensely interesting book, published in July. Fundamentally, as he says, the ideas are the same, the main discussion being one of rural conditions and the relation that the state should bear toward them. And the word "State," Dean Bailey uses in its boarder sense, that of government, whether national or more limited.

For one thing this book ought to prove a valuable antidote to the hysteria that has of late afflicted many individuals and no few communities as concerns "abandoned farms." These the author has discussed in their true light, with the additional and highly beneficial point of view of the observer of rural conditions, changes and tendencies. He knows not only what farming is, but how it is done or, perhaps, not done, in many cases and in what respects the "new agriculture" and the old, or at any rate conservative farmer have not become reconciled. So that if we feel at any time that we would like and could profitably receive a little more knowledge concerning these things (and how many of us would and could not!) we can gain information that is broad minded, comprehensive and comprehensible by spending an hour or so with this book.

It is typical of Dean Bailey's style however, in that it suggests many more points than those it discusses in detail. For the person also who likes to think, and to have problems suggested to him, this book will prove an inspiration and a source of enjoyment. As an interesting, clear and uptodate discussion of an important vital set of questions of rural economics, it is a worthy addition to the literature of the year.

First Course in Biology. By. L H. Bailey and W. M. Coleman. Illustrated. 5½x8 inches, 520 pages. The Macmillan Co., New York.

The student who makes a careful and comprehensive study of this book will, without doubt, find himself in possession of a very broad foundation for any future biological work. And the method of teaching which it illustrates is in keeping with the modern ideas of practical work, "the learning by example as well as by precept." That is, while it is an interesting and instructive text and while the abundant illustrations greatly elucidate or rather supplement it, yet the exercises suggested and the review question throughout have been chosen with the admirable purpose of making the student think, observe and use his store of common "horse" sense.

While the volume is designed for secondary instruction, it appears in places to almost encroach upon the domains of more advanced work, at least, as such advanced work is, at present, included in the curricula of many universities. This point, however, is one that is often discussed and if as is often suggested, there should come a relegation of the work of the Freshman year standard to the secondary schools, just such books as this will make such a change practicable.

The illustrations, already mentioned deserve special recognition. Aside from several colored plates, there are some 640 figures which are highly realistic and accurate, many being reproduced from standard works on scientific subjects.

The authors have prepared apparently a very exhaustive text and have done their work conscientiously and thoroughly insofar as it could be done. But biology, even a first course is a vast subject and it is a heroic undertaking to cover it in one small volume. One other point occurs to us. These are the days, it is said, of awakening knowledge, when Nature should be entirely a friend, an open book so far as she is understood. We understand that there is a movement to replace prudishness and old-fashioned taciturnity with sensible, healthy, sane instruction in the vital and hitherto ignored questions of life and its reproduction. Can there still be no instigation, no institution of this reform in a text book such as this, which offers no logical and accessible an opportunity to meet facts from the point of view whence they should first be met—as wonders and truths of Nature?

We are pleased to acknowledge with thanks the receipt of *Mr. Crewe's Career* (The MacMillan Co., N. Y.), which we shall be glad to review in a forthcoming issue.

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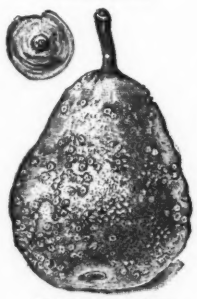

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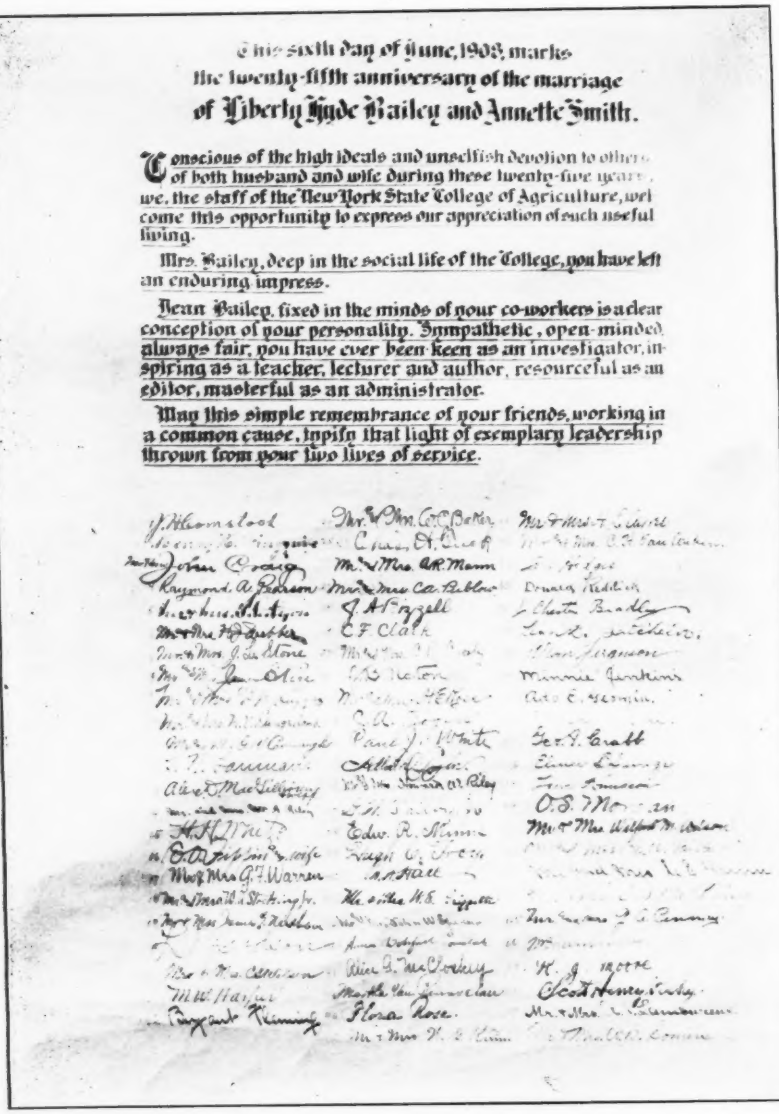

This sixth day of June, 1908, marks
the twenty-fifth anniversary of the marriage
of Liberty Hyde Bailey and Annette Smith.

Conscious of the high ideals and unselfish devotion to others of both husband and wife during these twenty-five years, we, the staff of the New York State College of Agriculture, welcome this opportunity to express our appreciation of such useful living.

Mrs. Bailey, deep in the social life of the College, you have left an enduring impress.

Dear Bailey, fixed in the minds of your co-workers is a clear conception of your personality. Sympathetic, open-minded, always fair, you have ever been keen as an investigator, inspiring as a teacher, lecturer and author, resourceful as an editor, masterful as an administrator.

May this simple remembrance of your friends, working in a common cause, typify that light of exemplary leadership thrown from your two lives of service.

THE SCROLL PRESENTED TO DIRECTOR AND MRS. LIBERTY HYDE BAILEY, JUNE 6, 1908.—SEE PAGE 41